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ABSTRACT

The conference "People and Technology: Investing in Training for Europe's Future" was the largest combined conference and exhibition ever launched by the European Community in the field of vocational training. The major themes discussed during the course of the conference were the future of training and work in light of technological change; education, training, and technological change in industry; job creation and new ways of working; the effects of the new technologies on educational, business, and training activities; training and technology policies for Europe's future; the impact of new technology on education and updating; new technologies and young people's future working lives; and investment in enterprise and job creation. The first of four parts outlines the major goals of the conference and the major action areas discussed by the conference participants. Part II consists of summaries of the main speeches delivered, and Part III summarizes the round table discussions and forums that were held on the following topics: the effects of the new technologies on educational, business, and training activities; basic education, training, and employment; new training materials and new qualifications; new technologies and enterprise creation; the impact of technological training on productivity and competition; management training for change; education and industry partnerships; and enterprise creation. Part IV is a report on the conference exhibition. (MN)

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# People and Technology:

## Investing in training for Europe's future

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## A joint EEC and MSC conference report

Edited by

**Janet Smith**

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# PEOPLE AND TECHNOLOGY:

## INVESTING IN TRAINING FOR EUROPE'S FUTURE

People and Technology:
Investing in Training for Europe's Future, Volume 1 is a conference report in the new series "EUROTECNET".

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JANET SMITH
editor

# PEOPLE AND TECHNOLOGY:

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Volume 1

PRESSES INTERUNIVERSITAIRES EUROPÉENNES
MAASTRICHT

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# Preface

A major conference *"People and Technology – Investing in Training for Europe's Future"* took place in London, United Kingdom during 25 – 27th November 1986. Held during Britain's six month term of presidency of the European Communities Council of Ministers, the conference and accompanying exhibition was co-sponsored by the Commission of the European Communities and the UK Manpower Services Commission.

Major themes discussed during the course of the conference were:

* TECHNOLOGICAL CHANGE:
  THE FUTURE OF TRAINING AND WORK
* EDUCATION, TRAINING AND TECHNOLOGICAL CHANGE IN INDUSTRY
* TECHNOLOGICAL CHANGE:
  JOB CREATION AND NEW WAYS OF WORKING
* THE EFFECTS OF THE NEW TECHNOLOGIES ON EDUCATIONAL, BUSINESS AND TRAINING ACTIVITIES
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* NEW TECHNOLOGIES:
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People and Technology was the biggest combined conference and exhibition ever launched by the European Community in the field of vocational training and proved to be a unique political, educational and commercial event, providing a major forum for the most extensive exchange of ideas, training information and techniques in the new technologies within the European Community.

A short report, such as this, cannot do justice either to the scale of the event, or the range of depth of discussions. The European Centre for Work and Society, as publishers of this report, prepared

by Janet Smith, would like to acknowledge the Commission of the European Communities and the Manpower Services Commission for making the conference possible and pay tribute to the quality of contributions made by speakers and delegates.
Grateful acknowledgements are also due to the members of the EUROTECNET projects and other exhibitors and to Queensdale Exhibitions for their technical organisation of the conference.

# INTRODUCTION

Father Jose Maria Arizmendiarrieta, the priest who inspired the development of the Mondragon co-operatives in Spain, once said "the sign of vitality is not to endure, but to be reborn and adapt". The conference People and Technology - investing in Training for Europe's Future, bears out Father Jose's dictum. The social and economic vitality of Europe rests on our ability to change and adapt.

New, or Advanced Technologies embrace a number of recent technological developments, from biomolecular engineering and renewable resources technology to laser technology, fibre optics and the development of new materials. But perhaps the technology which has made most impact on everyday lives and which has considerable implications for education and training is Information Technology (IT). A widely accepted definition of IT is the acquisition, production, transformation, storage, retrieval and transmission of data by electronic means in vocal, pictorial, textual or numeric forms. The applications of IT have profound social, economic and cultural implications. The commodity is information; the business is communication; and it affects the lives of everyone.

*"The main resource of the European Community is its human resources, its people. Giving them proper training and thereby enabling them to master the technical, social and cultural changes of the end of this century is the major challenge of today".* (Mr. Manuel Marin, Vice-president of the Commission of the European Communities).

*"... focus attention on the significant benefits to be obtained from investing in training from the new technologies. Without doubt, workforces which possess the skills to exploit these technologies will play an essential part in securing Europe's future prosperity"* (Mr. Bryan Nicholson, Chair of the UK Manpower Services Commission).

The Member States of the Community agree that Europe stands at the frontier of a technological revolution. New technologies are now affecting the everyday lives of Europe's citizens in ways undreamt of as little as ten or fifteen years ago. New technologies bring about

job losses, but they also lead to the creation of new jobs, new industries and services; and they lead to changes in working patterns and skill requirements. Responding to this level of change requires a massive increase in the quality and quantity of training and the development of training methods which are more flexible, more accessible and more cost-effective. Ironically, it is the new technologies themselves which can provide many of the tools needed for the job - computer-based training methods and materials, interactive video, open and distance learning and the modularisation of training courses.

But however good the tools, they are only effective if used wisely and within an overall strategy. The introduction of new technologies, as well as the new training strategies, need to be underpinned by appropriate political, economic, educational and social policies.

Training has, of course, long been an important priority for the European Community, but the rapid advance of new technologies has lent a new urgency. Recent years have seen many changes in the economies of Europe, with heavy job losses and fierce international competition. The Vice-president of the Commission recognises the need for Europe to work **with** change and not fight **against** it:

> *"...not only does the EC recognises the importance of investment in new technologies, but the need for improved and different forms of training to maximise on that investment is high on the agenda of the Commission. New forms of collaboration must be developed which increase initial and further training and special attention must be given to the disadvantages suffered by poorly and non-qualified workers - disadvantages which, if we are not careful, will be accentuated by training for the new technologies. The challenges of the new technologies will not be met by producing a highly trained elite with the qualities of flexibility and adaptability.*
> *The workforce as a whole needs to be motivated to participate in training throughout working life."*

Two major Community programmes demonstrate the level of European-wide commitment to these issues. The first is the EUROTECNET programme which consists of three strands:

- a network of innovatory demonstration projects to develop links between Member States in their attempts to tackle the social, educational and training consequences of rapidly developing

new technologies;

- a series of concerted research actions;
- a programme of study visits for vocational training experts.

Current priorities in the network of innovatory projects are:

1. The role of training in new information technologies in the development of small and medium-sized enterprises.
2. The training of young people in new information technologies - especially those with a low educational level.
3. New information technologies in the training and re-training of adult skilled workers.
4. The need for women returning to work to benefit from training and re-training in new technologies.

Research themes to date have concentrated on new qualifications, the local and regional management of human resources, in-company training aimed at smaller businesses, and developments in distance learning. Results of all four research themes, published with the co-operation of the European Centre for the Development of Vocational Training, were made available to conference delegates and visitors to the Exhibition.

In January 1987, the Commission formally launched the COMETT programme (Community Action Programme for Education and Training for Technology).
COMETT will provide support for the development, by industry and higher education, of advanced education and training related to new technologies.
The programme will forge new patterns of co-operation between small and medium-sized enterprises and large firms and the tertiary education and training institutes, aiming to produce highly trained personnel for new and developing industries.

Both EUROTECNET and COMETT will provide a solid foundation on which to build a European perspective and action on training in the new technologies. Co-operation is the cornerstone and the Commission is calling upon the social partners to work together in partnerships that go beyond the rhetoric to practical actions:

**employers and industry** – to increase their commitment to and investment in human resource development;

**workforce and unions** – to work towards a pattern of training which meets industry's requirements together with individual needs and aspirations;
**politicians and governments** – to develop the economic, industrial, social and educational policies which will provide a supporting framework within which the social partners can operate.

The conference outlined the two main areas for action - **technological training and access to jobs** and **technological training, productivity and competition.** The first area, the role of new technologies in the training of young people, the disadvantaged, women returning to work and the long-term unemployed, is concerned with structural changes in the content and delivery of education and training to provide access regardless of race, sex, disability or class. Training and continuing training must provide recurrent opportunities for learning which are tailored to the specific needs of different **Target groups** (women returners, workers with redundant skills, managers, entrepreneurs, young women and young men, ethnic minorities, the disabled), different **occupational sectors** and different **regions or localities** within a country. A more business-like approach to the education and training of those on the margins - the disadvantages, the discriminated against, the de-motivated and the de-skilled - is needed for it is here that there is most wastage of human resources.

The second area for action is the relationship between technological training and productivity. To increase economic performance, industry invests in product research and development, but how much value does industry give to investment in training and developing human resources? Both workforce and management need recurrent training in technical skills and new approaches to their work. Making best use of new technologies to improve productivity is not simply a question of installing the latest equipment, but also depends on effective management and efficient organisation. The introduction of new technologies needs to be carried out in a considered and systematic way and this, in turn demands skills and expertise on the part of senior management, supervisors and production personnel.

Small and medium-sized enterprises are currently providing dynamic economic expansion in new products, services and markets. Combine them with new technologies and even more possibilities for enterprise and job creation are opened. New technologies offer the potential for innovation, but only if they are

matched by managerial skills which include the capacity to innovate. A company, large or small, which cannot innovate is not well managed. Small businesses need assistance with the introduction of new technologies and in the training of managers, for, unlike large and multi-national companies, they often do not have well-defined structures for management and workforce training.

This brief introduction sets out the framework for reporting the ideas, strategies and actions discussed during the **People and Technology** conference. For those who attended the conference it will serve as a reminder of the very full and detailed discussions that took place; for those who did not attend the conference, it may prompt an interest and provide some initial reference points and contacts.

Improvements in education and training for the new technologies, and increased investment in the development of human resources are vital to the economic future of Europe. This report details the kind of policies, strategies and actions which are needed to make these improvements. Whether they are implemented or not is largely a matter of priorities and whether the key actors in the Community are willing to learn from the experiences - successes achieved and mistakes made - in other Member States. Much good practice exists and simple, human intelligence dictates that it makes sense to learn from this Community resource.

# Section One:
# Summaries of the Main Speeches

**Speech** *Technological Change: The future of training and work.*

**Speaker** *The Right Hon Lord Young of Graffham*

**Biographical details** *Lord Young was appointed Secretary of State for Employment in the UK Government in September 1985.*
*Prior to this he was Minister without Portfolio with a special remit to promote policies for the growth of enterprise and the creation of jobs. He was Chair of the Manpower Services Commission from 1982 – 1984. He is a qualified solicitor.*

**Speech quote** *"Europe stands at the frontier of a technological revolution. Our people are experiencing technological changes which affect every aspect of their work and daily lives, in ways undreamt of as little as ten or fifteen years ago. The pace of change is increasing. Everyone here today is aware that if Europe is to compete successfully in international markets.... then we must respond – and respond quickly – to the technical, economic and cultural challenges which new technology bring".*

## Main points of the speech

1. The focus of the conference is twofold:
   - technological training and access to jobs, particularly for disadvantaged groups (young people, women, long-term unemployed);
   - technological training, productivity and competition, particularly upgrading of skills in new technologies.

2. Changes brought about by New Technologies:
   - the changes in working life over the past 10-15 years;
   - the changing content of jobs;
   - the emergence of new jobs which require new skills;
   - new skill requirements create a demand for new types of training;

- the need to increase the quality, quantity, flexibility, accessibility and cost-effectiveness of training.

3. Harnessing new technologies themselves to develop training programmes:
   - computer-based training;
   - interactive video;
   - artificial intelligence.

4. Recognising the need for training and re-training throughout working life by:
   - increasing investment in training;
   - ensuring that training provision meets the requirements of industry;
   - establishing collaborative structures to identify new skills and develop appropriate training;
   - encouraging partners, industry, government, education training providers, and individuals, to recognise their responsibilities.

5. Examples of good practice can be a powerful stimulant to constructive action. A summary of UK achievements:
   - Open College;
   - training Access Points;
   - integration of new technology in all government training programmes.

6. The importance of European co-operation and the sharing of ideas and experiences:
   - the European Community's strong advocacy of training, especially in priority areas such as youth training and the training of women;
   - EUROTECNET network of demonstration projects;
   - COMETT programme of support for industry and higher education.

7. Invitation to the audience to address the issues of how the new technologies will affect the future of training and work and the responses necessary from the European Community.

**Speech** *Education, Training and Technological Change in Industry*

**Speaker** *Mr. Mathias Hinterscheid*

**Biographical details** *Mathias Hinterscheid has been the General Secretary of the European Trade Union Confederation (ETUC) since 1976. As well as an extensive career in the Luxembourg Trade Union Movement. Mr. Hinterscheid has also been a party leader and Vice President of the Luxembourg Socialist Labour Party and the General Secretary of the Luxembourg Consumer's Union.*

**Speech quote** *"The call of the Unions is not to oppose technology, but to control it, through a more highly skilled workforce, through greater influence on technological developments and by forward-looking policies which take account of the consequences of technological decisions for work conditions and employment.*

## Main points of the speech

1. Investment is needed in education and training not only to improve the performance level of the workforce, but also to equip them with the skills to be able to participate in decision-making about the new technologies.

2. It is general competence, rather than narrow specialised training, which will equip the workforce to take such decisions.

3. On-off initial training is no longer sufficient. A broad foundation training is needed which leads on to later specialisation and recurrent training.

4. Flooding schools with computers is not the way to prepare young people for new technologies.

5. New technologies must not be allowed to increase the gap between a highly qualified workforce and the pool of unemployed; between rich economic regions and poor ones.

6. Information, consultation and collective negotiation forms the backbone to successful introduction of new technologies.

7. Unemployment and its solution represents a much greater challenge to Europe than new technologies.

8. The ETUC calls for a five-point plan of attack:
   - fight unemployment with a co-ordinated strategy;
   - ensure that the skill level of the workforce is constantly updated with lifelong training;
   - increase the social competence of the workforce to take decisions about new technologies, inside and outside the workplace;
   - work towards the re-distribution of work through reductions in working time;
   - collective responsibility for the social acceptability of changes brought about by new technologies.

**Speech** *Education, Training and Technological Change in Industry.*

**Speaker** *Mr. Philippe Meyer*

**Biographical details** *Philippe Meyer is the Director for Social Affairs for the Union of Industries in the European Community (UNICE) which represents the European Employers and Industries Federations' viewpoint to the European Institutions. He has recently been seconded to UNICE by IBM Europe in Paris, where he was employed in managerial and executive positions in the Human Resources Department for the past 27 years.*

**Speech quote** *"It was a Chinese philosopher from the 3rd century B.C. who said 'When planning for a year, plant corn; when planning for a decade, plant trees; when planning for a lifetime, educate and train people'.....*
*In the last century, Disraeli said 'In a progressive country, change is inevitable; on the education of its people depends the future'.....*
*If you pay peanuts, you get monkeys; and if you think education is expensive, try ignorance".*

## Main points of the speech

1. Investing in training for the new technologies is a corporate responsibility between:
   - education (to make sure that schooling develops the motivation to learn);
   - employers (to budget for training as capital investment);
   - employees (to improve the quality of their work through training).

2. Important factors which have a bearing on the kind of training policies which are needed are:
   - 80% of those employed now will be in the workforce in the year 2000, but there will be a large number of new jobs which we cannot define today;

- the speed with which knowledge becomes obsolete is increasing and varies from 3 years (in fields such as biotechnology) to 10 years (in the education field);
- currently 70 - 80% of the workforce have lost contact with training.

3. There is no valid alternative to new technologies; they must be encouraged and ways must be found to deal with the changes they bring.

4. Used wisely, technology can offer a solution to unemployment.

5. European harmonisation on training for the new technologies is not the answer – individual solutions are needed, but, as a Community, those solutions need to be developed quickly.

6. The three main issues which need to be addressed by the education and training system are:
   - how to raise awareness, and change attitudes and behaviour towards training for the new technologies;
   - how to connect people to lifelong learning and to move away from the current model of basic education;
   - how to ensure that teacher training provides continuous updating in knowledge and equipment.

7. Working patterns need to be adapted to accommodate training:
   - reduction of working time and more use of home and personal time for training;
   - using information technology to improve the delivery of training;
   - using new training approaches, such as distance learning.

8. Trainers need to be selected from among the best, well-trained in multi-disciplinary skills and have opportunities for continuously updating those skills.

9. Further thought needs to be given to the training delivery mechanisms to small and medium-sized enterprises and to the training of entrepreneurs.

**Speech** *Technological Change and New Ways of Working.*

**Speaker** *Mr. Ulrich Gruber*

**Biographical details** *Mr. Gruber was appointed to the position of Director of Training and Further Training for Hoechst AG in 1971. He studied history and political science and taught in a secondary school from 1964 – 1971.*

**Speech quote** *"We are finding ourselves moving away from the world of the specialist, which already belongs to the past and into the world of the generalist, the allround worker, who can adapt to each emerging situation" (John Naisbitt 'Megatrends').*

## Main points of the speech

1. New technologies, such as microelectronics, new materials, products and processes, have already brought about many changes in the structures and processes of manufacturing and service industries and will continue to do so in the future.
   This process of change includes:
   - new forms of work organisation;
   - new work content and activities;
   - demands for new types of qualifications.

2. New technologies present an increasing challenge for the individual as well as for the whole education and training system. No longer is it possible to take for granted that the same job will last for the whole of a working life. This means a better co-ordination of basic initial qualifications with updating and continuing training in the workplace.

3. Initial and further training must be compatible with the complexity and content of technical changes in occupations.

4. Abstract ideas and theoretical knowledge must be learned in a way that relates to practical occupational tasks and situations. These new ways of thinking and doing are essential in order to master the changing demands of work.

5. New occupational profiles will emerge; existing ones will be brought together. The social partners and policy makers must:
   - analyse these new trends and develop corresponding occupational profiles;
   - identify the necessary skills, not merely job specific knowledge, related to the new occupations. Increasingly complex work situations require a more educated worker;
   - occupational skills and competence are not solely acquired through vocational training;
   - further training on the job is an important element in the maintenance and updating of skills and ensuring that they are compatible to changing technical and organisational developments.

6. New forms of work organisation, such as job enlargement and job enrichment, will lead to greater job satisfaction.

7. New developments not only require more specialised knowledge and greater technical ability, they also require, and make possible, responsible attitudes and creative performance.

8. Greater value must be placed on the willingness to learn. Flexibility is a key element of the future of the world of work.

**Speech** *Training and the New Technologies: Policies for Europe's Future.*

**Speaker** *Mr. M. Marin*

**Biographical details** *Manuel Marin has been Vice-President of the Commission of the European Communities with responsibility for Social Affairs, Employment and Education and Training since January 1986. From 1983 – 1985 he was secretary of State for relations with the European Community, as chief negotiator for Spain's accession to the Community. In 1977 and 1982, he was elected member of the Spanish parliament for Ciudad Real. He has degrees in law from the University of Madrid and in Community law from the University of Nancy, France.*

**Speech quote** *"This conference provides me with the opportunity to underline the importance of human resources as a key factor in internal labour markets as well as in the economic and social development of the Community... As a consequence, training must be seen as material investment closely linked to a forward-looking management of all the factors involved in production".*

## Main points of the speech

1. Human resources are the cornerstone of the European labour market. The concern for investment in these resources and the need to develop a Community strategy has been translated into action by the launching of EUROTECNET.

2. The qualification and re-qualification of the labour force are not new problems; there has been a long-standing concern over the lack of skilled workers in certain occupational areas and regions of the Community. New technologies have brought into sharp focus the urgent need for a complete renewal in the methods and approach of training.

3. It is no longer a question of the quantity of training, but the quality of that training, and flexibility is the key. Qualifications which allow for change are essential if workers are to be able to move from one area of work to another as the demands of the labour market change.

4. New technologies are responsible for the disappearance of unskilled jobs and the emergence of new jobs for which people do not have the necessary skills. A well trained labour force is needed to take advantage of and adapt to new situations.

5. The training policy responses are not easy to define, nor will they be identical for different branches and sectors of the labour market. There is an urgent need to invest in training and this places training at the centre of the political agenda.

6. Training policies must focus on three issues:
   - the need to develop training programmes which develop a positive attitude towards training itself;
   - the necessity to see training as basic individual right;
   - the place of training as a material investment and part of the financial planning of individual firms and enterprises.

7. The succes of new training policies depends on the motivation of workers to participate in training.

8. To guarantee this training, it must not be limited to the short term and specific requirements of individual firms, but must lead to qualifications which make vocational mobility and flexibility possible.

9. The adaptation of the workforce to rapid change can only take place if the workers are involved in the individual company's internal development strategies.

**Speech** *Education and Updating: The impact of New Technologies.*

**Speaker** *The Rt. Hon. K. Baker MP*

**Biographical details** *Kenneth Baker was appointed Secretary of State for Education and Science in May 1986. He is Member of parliament for Mole Valley. From September 1985 – May 1986, he was Secretary of State for the Environment.*

**Speech quote** *"It took a century for the results of the first industrial revolution to spread across the globe. It now takes a decade at most... There is always the risk that the rate of change will move too far ahead of public attitudes. We can hold technology as a light to the imagination of the young, but we must show a way forward for the parents.... Many people are suspicious about new technology. We must build confidence through training".*

## Main points of the speech

1. In the last 17 years which have seen such a rapid change in the introduction and use of new technologies, a new generation has been born and now populates our schools.

2. To arm this new generation with the skills needed, 100,000 microcomputers have been placed in schools in the UK and the government has spent £ 23 million in developing software teaching programmes.

3. New technologies goes far beyond information technologies and includes biotechnology, new materials and processes, new regulations and standards and new working methods.

4. No part of the labour market is unaffected by new technologies, from agriculture to engineering, from the shopfloor to the boardroom.

5. Education and training cannot end at 16, but must go on throughout life.

6. Further education in the UK is responding to the challenge of updating skills through the Professional, Industrial and Commercial Updating (PICKUP) programme:
   - vocational training for adults already in employment wanting to update their skills;
   - involves collaboration between employers and colleges;
   - the training fits in with working schedules;
   - the customer, i.e. industry, pays and is self-financing.

7. Staff development of college lecturers is also important to update their skills and knowledge in order to pass it on to their students.

8. The UK government intends to set up a national network of regional technology centres, to transfer technology from the laboratory to commercial application in the marketplace.
   The functions of these centres include:
   - updating information on new technologies;
   - dissemination of this information in a form acceptable to industry, for example, courses for trainers and for decision-makers;
   - prodiving consultancy services for the implementation of new technology;
   - providing training for employees arising from the introduction of new technologies.

9. New technologies brings new demands for learning and new means for delivering it. It also radically improves our ability to provide information about opportunities for training as shown to the development of Training Access Points (TAPS).

**Speech** *New technologies and a Future Working Life for Young People.*

**Speaker** *Professor B. Schwartz*

**Biographical details** *Bertrand Schwartz holds the Diploma of the "Ecole polytechnique" and the "Ecole nationale superieure des mines" of Paris and is an "Ingenieur au Corps des mines" and a Doctor of Science. Since May 1985, Mr. Schwartz has been appointed Member of the Economic and Social Council, France.*

**Speech quote** *"The time is ripe for a meeting of minds in the business and educational worlds."*

## Main points of the speech

1. Underlined the importance of training actions for young unqualified people, giving the example of one such training programme in France.

2. There are three main reasons for placing special emphasis on this target group:
   - 700,000 unskilled jobs will disappear;
   - people with skills stay longer in the workforce;
   - the dreadful prospect of 1 - 2 million people unemployed for life.

3. The French training actions for the vocational integration of young people were based on two assumptions:
   a. that the target group of young people *were* employable;
   b. that there exist intermediary positions in the labour market which can be filled by these young people.

4. The training approach and methods were tailor made for the target group:
   - trainers were not too highly qualified, but themselves occupied these intermediary positions in the labour market, between unskilled and technician grade;

- questionnaires were sent to the firms co-operating in the scheme to find out about training needs;
- the *amount* of training was gradually increased, week by week;
- technical knowledge was taught through the medium of practical action.

5. The results of this new approach were positive:

   - the young people learned faster than they had in the past;
   - their motivation level increased during the period of training;
   - the training took them through a gradual development from ignorance and fear to realising that it was possible for them to develop skills and acquire qualifications.

6. The actions demonstrated that people can and must be trained to reach their potential. It was questioned whether the school curriculum as it exists today, as the first contact point with learning and training, makes it possible for people to realise their potential.

**Speech** *New Technologies: Investment in Enterprise Creation and Job Creation.*

**Speaker** *Mr. H. Christie*

**Biographical details** *Herbert Christie is the Manager of the Research Directorate of the European Investment Bank in Luxembourg.*

**Speech quote** *"Expenditure on R & D, software and training is not investment as it is traditionally defined, but it may be said to have the same characteristics of investment, that is, it is expenditure in the expectation of future return of various kinds".*

## Main points of the speech

1. New technologies pervade the whole of the economy; they represent new developments and changes, but they also function alongside traditional technologies. The 6 sectors which receive most investment for high tech development in Italy are: transport; telecommunications; information technology; medicine; machine tools; chemicals.

2. The idea that new technological development is accelerating rapidly may be mistaken because we have failed to recognise progress in the recent past.

3. Governments in most European countries have schemes for accelerating the growth of high tech in the belief that the benefits outweigh the stresses and strains of adaptation.

4. There are clear economic reasons for government support of high tech:
   - innovations are to be encouraged because of the economic gain to the government;
   - the high level of real wages in Europe can only be sustained through rapidly increasing productivity. High tech industries provide one of the few potentials for growth;
   - the growth of productivity in some areas may help to decrease prices;

- as Europe struggles to develop a single EC market, equal to that of Japan or America, government support for high tech is crucial. Once a high tech market is lost, it may be especially hard to recover.

5. Assessing job losses due to new technologies is difficult – while they may cause a reduction in jobs, the failure to introduce new technologies could have resulted in whole areas being lost to foreign competition and much greater job losses.

6. The link between job creation and new technologies is that new income from increased productivity may be spent in the service sectors.

7. The success of high tech projects is due to the same factors as success in more traditional areas and depends on:
   - The calibre of the promoter and the financial and technical marketing management;
   - degree of flexibility on the administration and organisational side;
   - motivation and quality of the staff.

8. The idea that high tech may be instrumental in developing the traditionally backward areas of Europe may be mistaken. High tech enterprises tend to be concentrated in geographical areas, where there already exist supporting networks for the success of the ventures:
   - concentration of human capital linked to a university system;
   - existing high tech companies and their customers;
   - suppliers of venture capital, lawyers, etc.

9. Few companies classify their expenditure on R & D, and training as investment, if they were to, it would increase their investment budgets by 40%. R & D expenditure represents more than 1/3rd of fixed capital formation in certain sectors; expenditure on software has increased from 3-10%; training only represents 2-3% of fixed investment.

# Section II: Summaries of Panel and Audience Discussions

## Round Table Discussion

# The effects of the New Technologies on educational, business and training activities

The ROUND TABLE DISCUSSION was chaired by Ms. Chantal Cuer (radio and television presenter, Télé-Journal, BBC, Channel 4, Londres Midi, Londres Soir, BBC French Service, UK Correspondent for Radio-Télévision, Luxembourg) who presented the members of her panel:

Dr. H. SCHMIDT (Secretary-General of the Federal Institute for Vocational Training, Germany)

Baroness PLATT OF WRITTLE (Chair of the Equal Opportunities Commission, President of the Institute of Training and Development, Chair of the Women's Working Group of Industry Year 1986, United Kingdom)

Mr. Bryan NICHOLSON (Chair of the Manpower Services Commission, United Kingdom)

Mr. A.K. GILL (Deputy Chair and Group Managing Director of Lucas Industries)

Mr. M. TISSIER (Head of Training, Confédération Francaise Démocratique du Travail, France)

Mr. D. BLOM (Manager of Training, Philips NV, Netherlands)

Mr. R.H. BIRD (Deputy Secretary, Department of Education and Science, United Kingdom).

A number of issues were raised by members of the audience (presented here in italics) and comments were invited from the panel and the audience.

### The Delivery of Education and Training.

*Shifting responsibility for training to firms and private employers closes off access to training for the unemployed or people on the margins of the labour market. Training opportunities within firms*

*are also more limited for unskilled and semi-skilled workers than for skilled and professional employees. Government schemes aimed at the disadvantaged in the workforce have the appearance of emergency measures and any innovative strategies they may develop are all too easily stifled by the established provision of education and training. Is not the fact that new technologies are overtaking our ability to train and produce qualified people to exploit them, an indication that the existing systems for delivery of education and training are in a state of crisis? Is this now the time to re-design the delivery mechanism to ensure genuine access to knowledge about new technologies, regardless of race, sex and disability?*

Some large firms do recognise the need to invest in human resources at all levels, but cannot wait for the statutory training agencies to respond to new training needs. Philips, in the Netherlands set up their own programme to train 7,000 of their workforce and met with a very positive response from employees. When the same firm provided training in computing in employees own time, 3,500 asked to participate. People *do* recognise the need for re-training and updating, and firms would like to certify the training provided for their employees, but it is difficult to get official recognition by way of diplomas or certificates. (BLOM)

One large company, Lucas Industries, with subsidiaries in 34 countries, a 1.6 billion turnover, spends 40 million on training simply because no education system provides them with the qualified employees that they want.
Some companies are investing increasing amounts of money as a means of increasing their competitive edge – the Lucas 'Competitive Achievement Plan' is one example of the use of training to increase industrial performance. (GILL)

## Collaboration between Training Providers

*Collaboration between training providers seems to be the key to progress.*
*What are the respective roles of the partners in national education systems and private firms for the development of education and training in the new technologies?*

Collaboration is not easy – relationships between education and industry are difficult to forge, difficult to operate and require a large measure of skill and understanding. The type of relationship and the nature of collaboration varies according to the educational sector:

- technical and vocational training schools/colleges can be geared closely to industrial and commercial needs;
- humanities courses at university level do not need such direct links, but still need to include awareness of industry and new technologies;
- university courses in applied natural sciences and technology need a very close liaison with industry and commerce. Various schemes and models for collaboration exist including student industry placements, using employers as guest lecturers, joint study visits between education/universities and industry. (BIRD)

In some EC countries, private firms are already established as major training providers. In the Federal Republic of Germany, for example, 65% of young people are trained by private firms. Co-operation is not only needed between education authorities and firms, but also between firms. In the Federal Republic of Germany, small firms, unable to provide adequate training on their own have formed consortia and are pooling training facilities and resources. (SCHMIDT)

## Involvement of the Voluntary Sector

*Education and training activities for the new technologies are not only provided by public authorities and private companies, but also by the voluntary sector. In the UK, there are 800 computer-user groups, run by amateurs, but which are the third largest information provider on viewdata systems. In developing collaborative strategies and policies for training in the new technologies, the role of voluntary sector should not be forgotten. Better co-operation is needed between the voluntary and statutory sectors to harness the power of the voluntary sector alongside the statutory provision of education and training.*

In the UK, substantial use is made of the voluntary sector for training in new technologies and the Manpower Services Commission already funds voluntary agencies as training providers. (NICHOLSON)

In France, the image of education and training provided by the voluntary sector is still a negative one, though this is slowly changing as the voluntary sector takes on more training functions. However, it is important that all sectors develop co-ordinated policies for training provision. (TISSIER)

Training provision run by the voluntary sector has been especially

effective in the provision of training in new technologies for women. Many of these activities are funded by a combination of funds from local government, national agencies and the European Social Fund. (PLATT)

## The Commitment of Management to Training for the New Technologies

*It may not be enough to ask that industry spends more on training. It is likely that industry does not know what it spends and that the level of spending is often determined not by the current needs of the business, but traditions and the availability of courses and qualifications. Attention needs to be focused on Management and Chief Executives, to encourage them to instigate change, to examine their existing investment in training and gearing the training plans to their companies' current and projected training needs.*

It is absolutely necessary that all those involved with the introduction of new technologies in a firm – starting with the managing director – clearly understand that investment in software and hardware will only produce results if the personnel who are to use the equipment are fully trained to do so. Only through training can the maximum potential of new technologies be realised. (TISSIER)

A chief executive cannot run a company properly without being aware of and committed to training. It is likely that increasing competition will be the major force for changing the attitudes of management. (GILL)

The managers of small and medium-sized enterprises claim that they are unable to make any substantial commitment to training since they:

- have no time;
- have contracts to meet on deadline;
- must put all their energies into productive work.

Advisory services for small and medium-sized enterprises can show these managers how to deal with these problems and their training needs. (SCHMIDT)

Managers need to understand that training is not just a matter of formal training courses, but can be part of work itself. This means developing creative strategies for job learning situations, job assignments, job rotation and the organistion of work so that it contains an element of training. (BLOM)

New technologies can themselves help to integrate training as part of the work process. People working with VDU's and computer operated machinery, for example, can tap into auto-didactic programmes. (BIRD)

## Improving Women's Training and Employment Prospects

*The percentage of women in the paid workforce has been increasing, but there is a danger that they will become trapped in the margins of the labour market – in low-level, semi-skilled or part-time work – or in occupational sectors under threat from new technologies. It is important to make women aware of the need for training to secure good employment prospects. What strategies can be used, not only to make education and training more accessible to women, but also to make women more flexible in their choice of occupation?*

At a general level, it is important to start early – to develop equal opportunities policies in primary and secondary schools and to make sure that girls begin and continue to study subjects which are relevant und useful for further training.
Specific strategies which have been tried in the UK include:

- nationwide awareness campaigns, such as Women Into Science and Engineering in the UK;
- properly planned work observation visits to industrial and technological enterprises;
- improving the image of technology and engineering – they are not 'hard' sciences, but 'human' sciences, concerned about the way people live and the quality of their lives.
- courses introducing women returners to new technologies need to be women-friendly and organised around their needs and responsibilities. (PLATT)

A scheme was started in the Federal Republic of Germany in 1979 to increase the number of girls training in occupations where women represented less than 1% of the trained workers. Within 6 years, the percentage of women training for these jobs had increased by 5% and 38,000 more girls were trained for these occupations in 1985 than in 1979. The scheme was a successful public relations exercise, women proved their competence in these occupations. But the problem is not tackled through training alone; women need access to employment and this is often where discrimination bites hardest. (SCHMIDT)

Looking at the needs of industry in the 1990's, there will not be enough male graduates qualified in the required science subjects. Projecting from the subjects now being taken by girls at second level schooling, there will not be enough suitably qualified women to fill these gaps. It will take 20 – 30 years before there is any real change in women's employment technological areas. (BLOM)

It is not only a question of improving access to training in certain 'need' areas, one must not underestimate what goes on inside firms which militates against women's participation. The way in which work is organised, the division of work and the culture of the workplace excludes women just as much as the lack of training. Legislation has been introduced in France on job evaluation and comparison to combat this problem and the integration of women into the workplace is also an objective of many unions. (TISSIER)

Encouraging more equal participation of women at all levels in the workforce is a question of training – not only training of women, but training of managers, supervisors, workers and the training of trainers. (PLATT)

Women who do break through the stereotypes and train in technical and industrial areas find themselves up against the barriers of sexism and discrimination from supervisors, trainers, employers and male colleagues. Anti-sexist policies in training courses would go a long way to attracting women into the new technologies. (AUDIENCE)

## Laying the Foundations of Technological Understanding

*Vocational training needs to be based on a foundation of technological literacy, built in the years of compulsory schooling. How can the foundations of technological understanding be developed prior to vocational training?*

Initiatives such as the introduction of more vocationally relevant curricula into secondary schools, developing new and flexible pathways of education and training and the introduction of a modular approach of training are some of the ways in which education systems can help lay the foundation for technological understanding and working life in general. (NICHOLSON)

A more generic approach to training means more emphasis on the general competences needed for working life – negotiation skills,

the ability to work in a variety of settings – alone, with others, in large groups, in small teams. In comparison with traditional academic qualifications, these capacities are undervalued. The challenge is how to shift basic educational values away from a narrow view of academic skills towards a broader understanding of education for competence and personal understanding. (TISSIER)

There seems to be a growing acceptance that on-off training at the start of working life is not sufficient to equip people to cope with a changing labour market and working patterns. Yet there is little evidence of policies which support the idea of lifelong training. Improvements are needed in basic education to prepare for the transition to working life, in the development of transition education itself and in establishing links between school and post-school education and training. (SCHMIDT)

Laying the foundation for technological understanding also means developing a positive attitude towards further learning and training. Early schooling determines an individual's ability and motivation to benefit from subsequent education and training (BIRD).

## The training of young people

*In the European Community, there are 6 million young people without jobs. Despite increasing commitment on the part of national education and training systems to improve the quality and quantity of youth training, it is still difficult to persuade young people to invest in their own training if they have no confidence that jobs will be available when they have finished the training. What strategies can be used in the face of high levels of youth unemployment to encourage young people to follow a training course?*

Training is not simply a means to an immediate end – specific training for a specific job. Training, whether of young people or workers already in the labour market, is the mechanism by which the general level of competence and expertise of the workforce is raised. Whatever the problems of the labour market – unemployment, redundancy, re-definition of jobs – these are magnified for the untrained. The economic and labour market changes brought about by new technologies require a workforce that is adaptable and flexible.
The components of youth training which are needed to produce this flexibility are:

- developing transferable skills
- developing the ability and motivation to learn
- developing skills in personal effectiveness
- training in information technologies.

The time lag that many young people experience before they move into the labour market means that they will need to keep their skills well honed and possibly updated through periods of work experience (NICHOLSON).

Girls who opt for training in areas traditionally associated with women's work may find themselves with poor prospects for stable employment. Better careers advice is needed to encourage girls to develop skills which are in demand – particularly in the new technologies to give them a firm foothold in the labour market (PLATT).

## Re-assessing Occupational Areas and Qualifications

*New types of jobs, requiring different qualifications and combinations of skills are developing all the time, but education and training authorities are slow to recognise their existence. Is it now time for official re-consideration of occupational areas and qualifications similar to that being attempted by the Federal Republic of Germany? How can such a large scale re-consideration be achieved?*

Part of the difficulty in developing new qualifications for changing job profiles is that our education and training systems have a tendency to relate qualifications to *occupations*, rather than to occupational *tasks* which are common to a range of occupations at different levels. This only preserves the past in the present and delays changes (AUDIENCE).

In the Federal Republic of Germany, the change in metal-working occupations may serve as an example. In co-operation with employers and unions, the Federal Institute for Vocational Training redesigned the former 42 metal-working occupations into 6 new occupations, the curricula for which will be released by the Minister of Economy, Trade and Industry at the end of 1986. A similar re-design of the curriculum has been undertaken for apprenticeship training in metal working, electrical engineering, chemistry and the printing industry. The re-classification of jobs in the Federal Republic of Germany was only possible because of a consensus between employers and unions and did not rely on government intervention.

However, to be successful, these changes need to be backed up by changes at school level. Schools need to take on the task of preparing young men and young women not only in computer literacy, but also for a broader technological and economic understanding and to deal with the social and cultural implications of new technologies.

The answer is improved general education and broadly based vocational training in which new technology is part of the general culture of work.
This is important because neither industrial nor government labour forecasting has been effective. Formalised education will always lag behind developments in the workplace. Similarly, vocational education cannot anticipate future technological developments. For these reasons, at a time of rapid change, education and training must focus on:

- providing opportunities for learning to cope with change and for learning to learn;
- training for performance;
- training to combine work and learning;
- teaching general knowledge, training in broadly applicable skills and leaving specialisation to further training.

There is little mileage to be gained from a European re-assessment and harmonisation of occupational categories, but the *methods* by which new structures are negotiated could benefit from European co-operation, in particular, co-operation between firms and the statutory training sectors to solve the training problems of small and medium-sized enterprises. (SCHMIDT)

## Option A
# Technological training and access to jobs

This section of the conference focused on the role of new technologies in the training of disadvantaged target groups and their access to the labour market. Aimed at educators and trainers, Option A examined three main themes:

- *Basic Education, Training and Employment;*
- *New Training Materials and Qualifications;*
- *New Technologies and Job Creation.*

OPTION A was chaired by Mr. A. Ramoff (Delegate for Vocational training, Ministry of Social Affairs and Employment, France) who stressed in his opening remarks that, while training does not create employment, training policies are an essential component of employment policies in four major areas:

1. Policies for the training of young people, for the unemployed and for those with redundant skills.
2. Policies to maintain the level of employment through changes caused by the introduction of new technologies.
3. Policies designed to increase the capacity to innovate.
4. Policies to support the emergence of new types of employment.

The keynote address was given by Mr. G. Holland (Director of the UK Manpower Services Commission) and is reproduced in full in Volume 2.
The following part of the report highlights the main issues arising from the keynote speech, comments from the panel members of each Forum and contributions from the audience.

# Forum 1: Basic Education, Training and Employment

| | |
|---|---|
| Discussion Leader: | Mr. R. Fothergill (Director of the Council for Educational Technology, UK) |
| Panel Members: | Ms. C. Verniers (Project leader of EUROTECNET project B6)<br>Ms. C. Pecorini (Project leader of EUROTECNET project I2)<br>Mr. L. Arundel (Chief Executive officer of the City of Dublin Vocational Education Committee, Ireland)<br>Mr. K. Kyriakidis (Project leader of EUROTECNET project GR1) |

The keynote speech set out clearly the basic education and training needs of the 1980's:

> *"In today's and tomorrow's world we need more education and training, not less. We need it in much greater variety and more accessible than ever before. We need it to be user-friendly, custom-built and tailor made to individuals in particular circumstances. We need education and training for all, throughout life, not just at the outset. And we need education and training competently and professionally delivered by people who are in tune with the world as it changes around us. We need leadership for the European Community from the Commission too.*
> *Education and training of people for the new technologies is crying out for collaboration, co-operation and sharing of experience".*

The major implications of today's technological changes for basic education and training are:

- that the future depends on access to education and training and on people who can and will think and act for themselves;
- that education and training must be concerned with capability, competence and creativity as much as comprehension;
- that education must be for all, throughout the whole of life. The

goal is an educated society, not an excellent minority;
- that learning through practical experience is just as important as learning in the classroom. Experience, Reflection and Learning is the key sequence;
- that today's and tomorrow's students – particularly older people – are calling for new offerings and approaches. These new students do not necessarily wish to take A before B before C;
- that the new learning will need new systems of profiles, examinations, credits and certificates which provide for experience and achievement to be recognised and enable people to pick up where they left off, sometimes many years before.

Far-reaching structural changes represent promise and opportunity for some, particularly those with skills in new technologies, the occupationally mobile and some young people. The prospects are very different for the unskilled, or those with redundant skills and no opportunities to acquire new skills. This means that many people, particularly the less educated and trained – will face transitions which will be difficult for them to manage because of their lack of preparation.

Both training for the new technologies and training using new technologies can help disadvantaged target groups to gain access to the labour market.
Two members of the panel, working in the EUROTECNET Projects, described how they had achieved this in their projects:

## Training Scheme for the Open University of Charleroi (FUNOC) in the new technologies.

FUNOC's training measures are designed for people with a low educational level and few qualifications, with priority being given to the long-term and young unemployed. The courses offer different types of training which offer not only professional qualifications, but also general competences as well as social training in, for example, personal effectiveness. The FUNOC courses are relying more and more on the use of new technologies which the organisers feel will open up "new horizons" for people with a low level of education.

FUNOC is a non-profit-making body which operates under a regional structure of local politicians, representatives of trade union organisations, voluntary educational organisations and teachers. Both the content and methods of FUNOC courses are radically inn-

ovative and have inspired changes in vocational schooling and in adult and further education.
In the field of new technologies:

- FUNOC has developed a new occupational qualification in the tertiary sector "technician in micro-informatics";
- FUNOC has designed a special course intended for young people with few qualifications in research and enquiry methods, data retrieval and statistical production and processing. The aim of the course is to train young people in methods of social enquiry so that they can apply their skills to local/regional employment, educational and environmental problems;
- informatics is built in to all FUNOC courses as an educational back-up.

## Ministry of Labour Computer Literacy Project

This project, sponsored by the Italian Ministry of Labour, Department of Occupational Guidance and Training, is concerned with the production and testing of computer literacy materials to be used in vocational training courses. The materials are aimed at the 16 – 25 age group and are organised in modules which offer flexibility for the user, but, at the same time, a guaranteed minimum standard of competence in computer literacy.

The project is under the control of the Committee for the Development of Information Technologies, which includes representatives of employers and unions as well as national and regional government. The course materials themselves are produced by well-known hardware and software manufacturing firms: Italtel; Siemens; Honeywell; Sircom; Main Systems and Management.

*(Further information on the above mentioned projects and on the Greek EUROTECNET Project: Mechanical Engineering Design Draughtsmen, Industrial Electronics Fitters, also presented during this session can be found in "The EUROTECNET Compendium" – New Information Technologies and Vocational Training, a network of demonstration projects. Published by the European Commission 1986).*

# Forum 2: New Training Materials and new Qualifications

| | |
|---|---|
| Discusssion Leader: | Mr. A. Hardenacke (Director General Federal Ministry for Education and Science, Federal Republic of Germany) |
| Panel Members: | Mr. A. Behrens (Researcher, Fraunhofer Institut für Arbeitswissenschaft und Organisation, Stuttgart, Federal Republic of Germany)<br>Ms. A. Westerhuis (project leader of EUROTECNET project NL2)<br>Mr. H. Jensen (project leader of EUROTECNET project DK2) |

In his keynote speech, Mr. G. Holland pointed to the use of technology to develop new training materials and approaches:

> *"It is fortunate indeed that the very technologies we have been considering themselves provide important means to the ends we seek.*
> *Open learning; distance learning; computer-based learning; the ability to use the technology of the workplace as an access point for learning – all are there and their exploitation could transform our lives.*
> *Learning at the time, place and pace of the individual's choosing at a price he can afford are all within our grasp and there for the taking, but, as yet, too little appreciated or known".*

To accompany this training it will be necessary to develop a clear, coherent, comprehensive and comprehensible system of qualifications.
Qualifications and standards are essential to secure and maintain a competent workforce; but qualifications must be built on demonstrated *competence* of skills, not on academic knowledge of a subject. It is not only the need for new qualifications emerging as a result of new technologies which are needed, but a whole restructuring of qualification systems:

> *"As we enter the world of the new technologies, may I suggest that at the heart of preparing people for that world... must lie some structure of qualification based on competence".*

The ensuing disscussion centred around the implications of training for the new technologies for:

1. the development of new training materials and methods;
2. curriculum planning and the development of new qualifications;
3. the changing role of the teacher/trainer.

## New Materials and Methods

Where new technologies are being integrated into existing jobs, the core skills and knowledge remain the same, but materials and methods based on new technologies can be used to improve the quality of the training for these jobs. What is required is not so much a revolution in training methods and materials, but their evolution.

The need for training for flexibility and mobility within occupational sectors is not new, but the need is more urgent if full advantage is to be taken of new technologies.

Problem areas in training methodology; increasing the skill level of the existing workforce; integration of young workers; and re-integration of the unemployed and women returners; can find many of their solutions by making use of new technologies. Distance learning, auto-didactic materials, but most of all, a modular approach, offer far more flexible training opportunities than traditional methods of training.

The familiar training pattern of separating theory and practice (e.g. 1/2 day theory; 1/2 day practice, or theory and practice taking place in different institutions) is not helpful and may even be damaging, particularly for the trainee who may only be able to grasp the theory if it is integrated with practice. There is rarely such a strict division between theory and practice in the real work situation and this needs to be reflected in the training curriculum.

The Forum concluded that solutions, both for training in new jobs developing as a result of new technologies and existing jobs which change as a result of the introduction of new technologies, must be worked out within national, regional and occupational frameworks.

## The Development of New Curricula and Qualifications

The introduction of new technologies can cause job profiles to change in one of three ways:

- occupations disappear;
- new job profiles emerge;
- existing jobs may be altered as work tasks are re-organised, sometimes involving new responsibilities and tasks not related to new technologies.

Narrow and specialised curricula cut off the possibilities for flexibility and quickly become out of date in a situation where job profiles change rapidly. The traditional method of developing training curricula leading to qualifications for a specific job needs to be repaced by analysing the skills, knowledge and new developments in occupational sectors *as a whole.*
In order to analyse whole sectors, as opposed to individual occupations within a sector collaboration is needed between trainers, curriculum developers and employers and employees actually working in the occupational sector under analysis. Analysing the whole sector in this way for the development of training curricula enables curriculum planners to see the changes in jobs and their impact on other jobs in the same sector. Both analysis and decisions on new curricula need to be taken as a *joint venture* between those in charge of the training and those involved in the actual performance of the job.

Discussions in many Member States on new curricula and qualifications are focussing on generic qualifications for a whole occupational sector. The criteria used for developing vocational qualifications are in need of renewal. Specifically, they need to take account of abilities such as logical and abstract thinking, a knowledge of systems, self-motivation and negotiation skills.

## The Changing Role of the Teacher/Trainer

It is necessary to ask whether the training of teachers and trainers has taken sufficient account of the education and training implications of the new technologies. The focus on generic skills and practical competence calls for a major change in the role of the teacher/trainer, away from an information giver to a facilitator or mediator of learning.

Trainers, of course, need to be technically competent in their particular field, but they also need to be competent in training methodology and techniques, particularly in techniques using new technologies. Hands-on experience of new technologies is just as important for trainers as it is for trainees. It is not enough for trainers to be taught about the new technologies, they need to see these new developments in operation, and to be confronted by the impact of new technologies in their field of training.

# Forum 3: New Technologies and Enterprise Creation

Discussion Leader: Mr E. Piehl (Director, European Centre for the Development of Vocational Training, Berlin)

Panel Members: Mr. C. Pritchard (Project leader, EUROTECNET project IRL8)
Mrs. C. Bonnafé-Pelissou (Agence Nationale pour le Développement de l'éducation permanente, France)
Mr. B. Pacquola (Project leader, EUROTECNET project I6)

New technologies are not only transforming old industrial tasks, they are paving the way for new tasks and enterprise creation:

> *"The new information technologies are cheaper and more accessible and more rapidly transferable than any that have gone before. Throughout the world they are being applied to old industrial tasks. Throughout the world they are giving birth to new activities, new processes and new products. The waves of change may not come at regular intervals.*
> *They may not follow a regular pattern. What we are likely to see are unpredictable rates and directions of changes, unexpected patterns and processes, disruption of the familiar and simultaneous creation of the new".*

This has important consequences for education and training for enterprise creation:

a. the ability to help oneself is the order of the day, but self-help is a challenge, it induces anxiety, it requires competence;
b. traditional management gives way to a need for enterprise and initiative;
c. collaboration and communication become essential;
d. subjects and compartmentalisation must give way to cross-disciplinary approaches and to team-work.

Drawing on the practical experience of the EUROTECNET projects, the discussion in Forum 3 focused on three issues concerned with

the creation and support of small and medium-sized enterprises (SME's):

- the importance of Regional and Local networks;
- advisory Services;
- creating Opportunities for Women.

## Regional and Local Networks

EUROTECNET project F9 has direct experience of the value of regional and local networks in the establishment and support of SME's. The project supports new production co-operatives developing new techniques in the field of computerisation and energy-saving mechanical processes. A network of the 10 co-operatives in the scheme has been formed which also includes research engineers from the public and academic sectors.

The co-founders of the co-operatives have formed an "intercompany club" in which knowhow and experience can be exchanged. It is hoped that this club will continue after the period of project funding.

It is not enough, however, to establish new networks for SME's if the existing (public and private) training and guidance networks are not aware of the special needs of SME's. This requires a restructuring of existing networks, a review of the occupational profiles of people working within them and an investment in their training, as well as technical and financial collaboration at local and regional level.

New technologies can be an important tool in networking, for example, in the techniques of video-conferencing as demonstrated at a recent EC-funded conference in Donegal, Ireland on "Information technologies in remote regions of the European Community".

## Advisory Services

New technologies offer many opportunities, but they can also be a source of difficulty for SME's. The cost of failure in selection or implementation can have catastrophic consequences leading to complete collapse of the business. The Irish EUROTECNET project IRL 8, has established a centre in Dublin which provides a range of services for small businesses on the application and impact of new technologies, particularly microcomputers.
The advisory service concentrates on three issues:

- awareness;
- selection;
- operational management of IT in small businesses;

and addresses the needs of the first time user through a self-help consultance course. Although the course is based centrally in Dublin, it has opened up employment opportunities outside the capital - 200 software companies have been set up by ex-students from the course, each employing less than 10 employees and selling their products on the international market.

## Creating Opportunities for Women

A recent report on SME's in West Berlin showed that 30% of newly established SME's had been set up by women.
The experience of the IRL8 project has shown that the percentage of women accepted for the IT management course has gradually risen and is now in excess of 50%. The success of female ex-students in finding employment, as opposed to establishing their own businesses, depends largely on overcoming employer resistance to employing women.

## OPTION B
# Technological Training; Productivity and Competitions

This section of the Conference aimed at employers, trade unionists and policy-makers considered the following themes:

- *Management Training for Change;*
- *Education/Industry Partnership;*
- *Enterprise Creation.*

OPTION B was chaired by Mr. G. Deurinck. (Managing Director of the Industry University Foundation, Belgium). Lord Lucas (UK Parliamentary Under-Secretary of State for Trade and Industry) delivered the keynote address (a copy of which is reproduced in full in Volume 2.)
The following part of the report highlights the main issues arising from the keynote speech and the ensuing discussions.

# Forum 4: Management Training for Change

Discussion Leader: Mr. M. Sherlock (Director AnCO, The Industrial Training Authority, Ireland).

Panel Members: Mr. G. Panizzi (Project leader EUROTECNET project I1)
Mr. R. Stepney (Project leader EUROTECNET project UK2)
Mr. L. Robert (Project leader EUROTECNET project L5)

In his keynote speech, Lord Lucas said:

> *"The success of Europe in the industrial application and exploitation of information technology in all its forms is going to be a basic requirement for the competitive survival and future prosperity of the Member States of this Community..... but our task is to ensure that the change is for the better, that we do not move into a soulless machine culture but that we harness new technology to make our lives richer in all senses.*
> *This challenge falls most heavily on management. They must not only be 'literate' in the technology itself, but must manage the human aspect of change. It is natural to fear change, but the creative manager can convert that fear and stress into an appetite for improvement.*
> *Management holds the key to making technology work for people and making the future of Europe a brighter one for all of us".*

Lord Lucas then went on to outline some of the ways in which senior management in the UK have been helped to deal with these changes:

- the introduction of new technology is not just a matter of installing the latest high-tech equipment – it requires balanced judgement, effective management and efficient organisation. Companies need to introduce new technology on a considered and systematic basis. This places demands on both senior management supervisors and production personnel to acquire the skills

and expertise necessary to introduce and use it. Training is vital if companies are to fully exploit the opportunities which new technology offers.

- the application of Advanced manufacturing Technology (AMT) (computer-aided design and manufacture, flexible manufacturing systems, computerised production control) will help European Industry counteract competition from Japan and the USA. The use of AMT equipment needs to be introduced on a coherent basis, ensuring compatability between the different pieces of AMT equipment. To this end, the Department of Industry organised a major demonstration of new computer communications technology in December 1986. This demonstration provided an opportunity for senior management to appreciate the scope for improving their company performance and help them recognise the skills needed to use this technology properly;

- The Department of Industry is also financially supporting the development of AMT training packages and materials:
  - assisting training providers with the costs of developing short courses on microelectronics applications;
  - providing grants for production of distance learning video courses related to microelectronics;
  - spending nearly 10 million helping small and medium-sized firms with consultancy and implementation costs of establishing quality management systems.

- The need for greater technical skills and flexibility in the workforce also includes management. One of the most effective management training tools is Interactive Video – combining the power of the computer with the flexibility and clarity of the videodisc. Interactive video (IV) can deliver specific training, e.g. how to use a particular computer, or it can simulate real-life situations, e.g. where a range of options, must be considered, where there is no right or wrong answer, but various consequences depending on the action taken. This type of training situation is very common, especially in personnel and management training, but can be time consuming if dealt with using traditional training tools. The National Interactive Video Centre, jointly sponsored by the UK government and industry, is an independent organisation which brings together producers and users of IV and which spreads awareness of IV technology and supports and develops new applications.

The panel and audience then went on to discuss issues arising from the keynote speech and the following questions:

1. How can managers be persuaded to grasp and use new technologies?
2. Where and how are managers to be trained?
3. How can entrepreneurs and managers of small companies be encouraged to develop a commitment to training?
4. How can new technologies be used for the training of managers?

Managers of small companies will purchase the expertise of consultants, rather than invest heavily in training. Training is expensive and small companies frequently operate on small profit margins and are more vulnerable to market fluctuations. The European Foundation for the Improvement of Living and Working Conditions has worked on the link between consultancy and the development of new jobs using new technologies. The Foundation is involved in two projects concerned with the introduction of robotics and the integration of systems. Focussing on the role of middle and high level management, it seems that the operational jobs will require a higher level of training in managerial skills and yet managers will also need a high level of technical competence. This points to a need for a different kind of management training for the new technologies.

The nature of management education and training may change as new information technologies take over some management functions and as external management services develop. But the demand must come from companies themselves and will vary according to the type of transformation the company is going through.

Methods for Management Training include on-the-spot coaching and distance learning. While individual coaching in new business and technological skills can be very effective, it requires an expert coach/trainer, who needs to understand the company and its environment before she/he can do the job. Not only is this expensive, particularly for small companies, but there is also a shortage of good trainers who can absorb a firm's need quickly and then set up an appropriate training programme. It may be that distance learning and computer facilities can make this task cheaper.

A research project in Italy called 'Organic Simulation' uses interactive video. It has developed a management training game which develops techniques for acquiring knowledge and applying it in relev-

ant situations.
This encourages managers to develop a capacity for combining all available resources.

# Forum 5: Education and Industry Partnerschip

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| Discussion Leader: | Mr. K. Holbraad (Director General of Vocational Training, Ministry of Education, Denmark). |
| Panel Members: | Mr. A. Kirchberger (Commission of the European Communities, Directorate-General for Social Affairs, Employment and Education).<br>Mr. R. Ziarati (Project leader EUROTECNET project UK3).<br>Mr. P. Diepold (Researcher, Seminar für Wirtschaftspädagogik, University of Göttingen, Federal Republik of Germany). |

Lord Lucas referred in his speech to higher education/industry links which play such a crucial role in producing the qualified man and manpower needed by the new technology industries. Some of the UK policies to achieve this better education/industry links include:

- The teaching Company Scheme involves 250 firms and over 60% of higher education Institutions and recruits high quality graduates to work full time in a company;
- The British Expertise in Science and Technology scheme (BEST) helps firms to identify relevant expertise in Higher Education Institutes;
- The Alvey programme – a consortium of industry, universities, the Science and Engineering Research Council, the Department of Trade and Industry and the Ministry of Defence – encourages information technology research through collaborative projects;
- The Engineering and Technology Programme has elicited the support of industry in the form of donation of equipment, loans of staff for teaching purposes and help with course design;
- The UK 1986 Industry Year was an effective strategy for encouraging links between secondary schools and industry. Over 60% of UK schools have now formed partnerships with local firms.

Lord Lucas concluded that the forging of such links, bringing together the resources of industry and academic and research institut-

ions to work in partnership is of great benefit to both, and to the country as a whole. And the partnership needs to extend right throughout the education system.
The panel discussion developed some of these themes further:

- Technology Transfer Centres are used to intensify the existing education/industry partnerships in the Federal Republic of Germany.
- Universities are research-oriented; industry is product-oriented, both have a great deal to offer each other, but a common language of ideas and approaches is a pre-requisite for succesful partnership between academics and people from manufacturing and service industries.
- An intermediary structure may be useful to serve as a link between universities and businesses and to work on innovative ventures.
- The COMETT approach to co-operation between universities and industries is to adopt a regional/sectoral approach, aimed at achieving technological transfer between institutions of higher education and firms, particularly small and medium-sized enterprises.
- Practical assignments on technical courses in colleges can be based on real problems facing industry – "ask firms what problems they have and try to solve them within the course – this is good for the students, good for the lecturers and good for the companies themselves".

# Forum 6: Enterprise Creation

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| Discussion leader: | Dr. G. Cacopardi (Director-General of Vocational Training, Ministry of Labour, Italy) |
| Panel Members: | Mr. P. Clémenceau (Researcher, Délégation à la Formation Professionelle, France)<br>Mr. H. Ralking (Management Advisor, Dafolo A-S, Denmark) |

In his keynote speech, Lord Lucas stressed the importance of innovation and enterprise creation:

> *"The future prosperity of Industry also depends upon the best use of our intellectual and innovative resources. Technologies are creating new industries and transforming old ones. International competition is fierce. The transfer of technology into industry is essential if new products and processes are to be developed to compete on world markets".*

Practical support is needed if innovative ideas are to be turned into products or services. The UK Department of Industry is involved in a variety of innovative and enterprise creation activities:

- the industrial Research Establishments and their support of research clubs;
- the UK Innovation Programme;
- the Small Firms Merit Awards for Research and Technology;
- Government support for business and technical advisory services;
- support for regional investment.

The potential for job creation for and by disabled people through the use of new technologies also needs exploiting. The Remote Work for Disabled People project (a EUROTECNET project funded by the DTI and the European Social Fund) has established remote work units, where employers are matched with disabled, home-based employees equipped with microcomputers.
Employment opportunities so far created include financial management, engineering, wordprocessing and computing.

Taking up the discussion on enterprise creation, the panel and audience raised the following issues:

The development of new enterprises is essential if new jobs are to be created – the question is how far can new technologies be used by small and medium-sized enterprises. To make best use of new technology for job creation, efforts need to go towards encouraging managerial skills in SME's. Training in management skills must include developing the capacity to innovate. A company which cannot innovate is not well managed.

SME's provide most potential for expansion. In Denmark, 80% of firms have less than 25 employees, but small companies need to be helped to develop new products and markets using the following checklist:

1. production;
2. organisation;
3. information;
4. alternative training;
5. new technology.

Training can help in the dual process of innovation and technology transfer and ensuring the stability and creation of jobs. The two major issues which need tackling are:

- the development of advisory and training services for small companies;
- the funding of training, who pays and how far can the cost of training be decreased through the use of the new technologies.

# IV: The Exhibition

Exhibitions are frequent events in the commercial and industrial world.
Over 70 exhibitors set up their stands at the "People and Technology Exhibition", which ran alongside the Conference. Not a vast number in comparison with some of the large international fairs, but a sizeable event in the education and training world:

> *"This is the first time that such a wide rang of materials from so many different parts of the European Community has been brought together under one roof to show Europe and the world the advances being made in helping people to adapt to technological change" (Manuel Marin, Vice-President of the Commission of the European Communities).*

Not surprisingly for a conference concerned with new technologies, the Exhibition was liberally sprinkled with microcomputer terminals and video monitors. The UK Department of Industry stand consisted of nothing else but television screens, providing a cubist impression of the UK EUROTECNET projects. The interactive video on display at the European Commission stand, on information on a wide range of Community programmes, invited spectators to touch the screen to continue or stop the video – a real hands-on approach! A demonstration of computer-controlled production techniques was to be found on the Danish stand – in less time than it took to pour a Carlsberg, a computer-operated engraving machine spelt out 'Vocational Training Denmark' onto red labels which those delegates lucky enough to be given one, wore with pride.

But it was not all high tech. Much of the information was conveyed through more traditional means, such as pamphlets and posters and large display boards. By the end of the three days, delegates could be seen groaning under the weight of carrier bags and briefcases bulging with glossy leaflets and packages of information.

But perhaps the most important communication of ideas took place through human contact – people talking with each other, walking round the stands, or relaxing at the bar, asking questions exchanging ideas and addresses.
And this is where the Exhibition provided a perfect complement to the Conference proceedings. Rarely at such large conferences do people have sufficient time to discuss practical ideas and actions, but this Exhibition provided just such an opportunity and, judging from the large number of visitors, many seized it with both hands.

It is not easy to report on an exhibition – they are designed to be visited, not read about. Much of the information was presented in visual form - with or without video monitors – and if "one picture is worth a thousand words", then a report on the People and Technology Exhibition would run to several chapters. It is hoped that this brief overview conveys someting which was not always evident during the Conference.
Speeches and discussion sometimes conveyed the impression that we, as a Community, are falling behind on investing in training, on using technologies to improve training techniques, on updating the skills of the workforce, on collaboration between education and industry. Yet even the most cursory of glances at the exhibition revealed that these things are happening.
Throughout the European Community, governments, private industry and public training authorities *are* rising to the challenge. It may be early days, but attitudes *are* changing, investment *is* being made and far from an ostrich-like approach to new technologies, as a Community, we are moving forward with a pioneering spirit to explore the new world that Advanced Technologies offer us.

The largest group of exhibitors were those displaying new approaches to education and training through the use of new technologies, including several examples of Interactive Video systems:

The BBC Doomsday Project system includes a BBC Master Series Microcomputer and a BBC Laservision Player. The system presents a massive amount of information with speed and simplicity. Using keyboard or trackerball, the enquirer has immediate access to maps, photographs, aerial views, descriptions, statistics, charts and moving video sequences. For those unfamiliar with British history, the first Doomsday Project was completed in 1086. The survey took a year and the results were recorded on parchment with quill pens. The BBC Doomsday project, finished 900 years later, to present a detailed portrait of the United Kingdom and the life of its people.

The 'Talent' range of training courses is designed and produced by Interactive Video Systems (IIS) and could be seen at the exhibition along with a number of tailor made interactive videodisc-based training courses designed specifically for larger organisations. IIS has developed some 14 modules dealing with a rang of training needs, from dealing with customers to the concepts of marketing.

VPS Interactive was created in 1984 to exploit the benefits of new information technology. It operates alongside VPS Video to provide a

complementary consultancy service in media technology. In their promotional literature, VPS highlight three areas where interactive video is an effective business tool:

"Video plays a vital role in achieving marketing, PR and advertising objectives. VPS recognise that the quality of the video is crucial in this competitive area".

"Businesses benefit from using video to improve relations, explain policy, stimulate internal dialogue or to reach external target audiences".

"Video is a proven and effective training tool, ideal for putting across information and changing attitudes".

The Training Technology Section of the UK Manpower Services Commission supports a series of initiatives aimed at developing good practice in the application of new training technology:

- computer-based training;
- interactive video;
- simulation;
- artificial intelligence.

The training topics covered by these initiatives range from the development of diagnostic skills needed by a high tech company in its manufacturing processes to the management of stress and coping with its effects.

The value of Open Learning Systems are recognised by private firms and public training bodies alike. The Open College, which launches its first courses in the UK in September 1987, represents a new approach to the training and continuing training of adults. The courses will be flexible, accessible and cover a wide range and level of skills and knowledge and will help people to change jobs, improve career prospects, enter or re-enter employment, and contribute to personal development. Employers will also be able to buy training courses and packages and small businesses will be encouraged with government grand aid. The Manpower Services Commission, who is initially supporting the development of the Open College, is spreading the word to employers in a glossy booklet:

"Open learning uses flexible, modular, self-instruction packages and multi-media learning materials. It may consist of self-study at convenient times, based on a flexible mix of computer-based learning, video and audio resources as well as printed materials. It may

also involve practical work in tailor-made workshops and training centres, together with tutorial help and advice from, either from your in-plant trainers or external sources. It is a highly effective method of learning which benefits both your company and your employees".

Various information networks and computer-based training systems to support open and distance learning were on show, including those from Olivetti, Maris-Net and Goal Systems.

Access to information about training opportunities as an important theme on many of the stands. The Manpower Services Commission displayed its TAP project, which provides information on vocational education and training through computerised Training Access Points in jobcentres, libraries and high street shops. A similar venture is underway in France by Centre Inffo which provides a range of on-screen information for adult education opportunities under the following headings: What are Your Rights?; Where to Find Information; Where the Training Takes Place; Regular Updating on Training Activities.
Microdoors is an example of a careers information database package, designed to run on a 16 bit microcomputer:

> *"A student might wish to check out her options in engineering; being computer-literate, it would be a matter of moments before she found her way to a selection of careers in engineering. Choosing the one of most interest, she could read about the work, the personal characteristics required, entry and training courses, opportunities and prospects and where to find further information. She could then print out and keep any pages of particular interest".*

Most of the training systems of projects on show were aimed at a broad general audience, but some exhibitors focussed on specific needs, such as the training of women. The Alida de Jong Training School for women in new information technologies is one of the Dutch EUROTECNET projects; the National Extension College (NEC) has produced a resource pack "Teaching Computing to Women". The NEC materials, to be used by teachers on introductory computing courses, integrate the technology with the social issues – an approach, says the NEC literature, which makes the teaching/learning process more stimulating not only for women, but for men as well.

The CEDEFOP stand also provided information on women and new technologies in its recently published survey of 15 information technology/microcomputer projects for women. The main points dealt with in the report are:

- target groups;
- project organisation;
- instructors and project teams;
- financial support;
- success of the projects;
- instructional objectives and subject matter;
- certificates;
- forms of teaching and learning.

Most Member States of the EC, including Spain and Portugal, were represented in the Exhibition. Their stands displayed methods, materials and results, to date, of the EUROTECNET projects in each country and some, e.g. the French, German and Danish, also gave wider information on national initiatives in education and training for the new technologies.

The European Commission stand provided a comprehensive view of the EUROTECNET projects, appropriately enough through an onscreen information display, details about the forthcoming COMETT programme, and information on training in the R & D field, eg exchange of resources. More general information on European initiatives in education, training and the new technologies could be found on the stands set up by EURYDICE, ETUC, CEDEFOP, Youth Forum and the European Foundation for the Improvement of Living and Working Conditions stands.

Time and time again, the phrases 'human resource development' and 'investing in human resources' were mentioned during the Conference.
Indeed, it is said that you can spot a European Commissioner if he (there are no women Commissioners) starts his speech "Europe's greatest natural resource is its people". But the exhibition showed that these are more than just jargon phrases. Many large companies are taking Human Resources Development seriously. For Example, the Volvo stand was run by its Human Resources Department. Volvo is proud of its "vast human library of experts" and has formed a consultancy group called Ergoma, which is responsible for packaging and selling this knowledge. Another Volvo venture – 'Dialog' is an educational programme designed to further communication be-

tween members of the Volvo Group. It is built on the belief that Volvo employees are the company's most important asset. Through competent and motivated people, Volvo believes it will be able to meet the many challenges that lie in the years ahead.

And for those who might still be unclear as to what Human Resource Development involves, a pamphlet offered by the Institute of Personnel Management had the answer:

"Human Resource Planning (HRP) may be defined as the systematic and continuing process of analysing an organisation's human resource needs under changing conditions and developing personnel policies appropriate to the longer term effectiveness of the organisation. It is an integral part of corporate planning and budgeting procedures since human resource costs and forecasts both affect and are affected by longer term corporate plans.
The term 'human resource planning' has been used rather than the more traditional term 'manpower planning' to indicate that planning the people side of the business involves more than demand/supply balancing. Human resource plans should encompass the widest range of personnel policies and cover as many aspects of managing people as necessary to achieve the longer term objectives of the organisation".

Indeed, if there was one unifying theme to the whole Exhibition, it was summed up in the large slogan above the Manpower Services Commission stand.
It read: **"People - The Nation's Greatest Resource"**. And if there was one over-riding message from the Conference itself, it was **"Don't Waste It"**.

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A major conference ***"People and Technology: Investing in Training for Europe's Future*** took place in London, United Kingdom during 25-27the November 1986.
Held during Britain's six month term of presidency of the European Communities Council of Ministers, the conference and accompanying exhibition was cosponsored by the Commission of the European Communities and the UK Manpower Services Commission.
The conference provided the opportunity to underline the importance of human resources as a key factor in internal labour markets as well as in the economic and social development of the Community. It is therefore that training must be seen as material development closely linked to a forward-looking management of all the factors involved in production.
Europe stands at the frontier of a technological revolution. The pace of change is increasing. Everyone should be aware that if Europe is to compete successfully in international markets, we must respond – and respond quickly – to the technical, economic and cultural challenges which new technology bring.
It is hoped that this report will contribute to that growing awareness and will emphasise the importance of human resource development.

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